How to get a PhD in AI

How to Get a PhD in Informatics

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A Daunting Prospect?

- Significant and Original Research.
- Creativity *is* learnable.
- Researchers Bible.
- Anyone can do it:
  sufficiently bright;
  work hard;
  take our advice.

Choosing a Project

Criteria project must meet:

- inspiring;
- significant and original;
- do-able;
- supervisable.

Sources of ideas:

- supervisor & other colleagues;
- read literature of chosen area;
- further work suggestions of others;
- previously, badly done work.

Types of Research

- Development of new techniques.
- Exploration of existing techniques:
  theoretical analysis;
  'rational' reconstruction;
  experimental exploration and hypothesis testing;
  comparison of several techniques;
  comparison to natural systems.
- Extension and improvement of existing techniques.
- Application of known techniques to new domains.

Hypothesis and Evidence

- What hypotheses will you investigate?
- Along what dimensions will you explore properties or relations of techniques or systems?
- What kind of evidence will you present to support your hypotheses?

Postgraduate Diseases

- Manna from Heaven.
- Ivory Tower.
- Solving the World.
- Ambitious Paralysis.
- Computer Bum.
- Stamp Collecting.
- Misunderstood Genius.
- Beating Around the Bush: philosophy + history.

Psychological Hurdles

- Loneliness of the long distance researcher.
- Research impotence.
- Early morning — Cold start.
- Fear of exposure.
- Dealing with criticism

Good Working Habits: Keeping Regular

- Regular hours: get a routine.
- Regular reading: outer, middle and inner circles.
- Regular writing: notes, technical reports and journal articles.
- Regular talking: informal chats, seminars and conference talks.
- Regular check-ups:
  where am I going?
  what will it be like when I get there?
  what step should I take next?

Exercise

In relation to your project, define the outer, middle and inner circles for your reading.

Structure of Thesis

Introduction: motivation, extended contents.

Literature Survey: broad and shallow.

Background: technical introduction.

Specification: what you required.

Implementation: what you did.

Results: how well it worked.

Related Work: deep and narrow.

Further Work: what is left to do.

Conclusion: significance of achievement.

Appendices: glossary, full results, example traces, selected code, *etc.*

Thesis Message

- Abstract of thesis.
- Each sentence corresponds roughly to thesis chapter.
- Whole reads as central argument of thesis.
- Helps ensure thesis hangs together ...
- ... and nothing is missing.

Thesis Message: Example

The Computational Modelling of Religious Concepts

by Fr. Aloysius Hacker

1. We apply ideas from Computer Science to the understanding of religious concepts.
2. Previous attempts to explain religious concepts, e.g. the holy trinity and miracles, have often encountered philosophical problems.
3. These problems arose because the appropriate terminology was not available. Computational terminology often provides an appropriate analogy.
4. Although some problems still remain, e.g. free will,
5. We are seeing the beginning of a new, computational theology.

Relations with your Supervisor

- Meet regularly.
- Provide written and oral reports.
- Talk over problems.
- You *can* swop them.

Summary

- You *too* can get a PhD ...

  ... just by following this simple advice.
- Keep doing meta-research.
- Keep regular — stay healthy.
- Communicate!

  Recommended Reading: Researchers Bible.

Overall Summary

- The scientific nature of Informatics,
  exploration of a space of techniques;
- Criteria for assessing Informatics research,
  similar to other science;
- The methodology of Informatics,
  signs of a maturing field.
- Research success is not magic,
  practical hints on how to achieve it.